REMARKS

Generally

On 01/21/2005, before the Office Action of 02/27/05 ("the OA") was mailed by the United States Patent and Trademark Office ("the Office"), the undersigned amended the subject application to address most issues subsequently identified in the OA. This Reply summarizes the amendments already made and addresses the remaining issues raised in the OA.

The following table identifies the issues raised in the OA, and indicates which issues have been addressed in the 01/21/2005 Amendment and in this Reply:

ISSUE	ADDRESSED IN 01/21/2005 AMENDMENT	ADDRESSED HEREIN
Information Disclosure Statement		X
Drawings	X	
Abstract	X	
Specification	X	
Claims Rejections – 35 USC §112	[redacted]	[redacted]
▪ Claim 21 – *for each remaining indexing cell type*		X
▪ Claim 21 – *the specific Boolean operation*	X	
▪ Claim 26 – *for each remaining indexing cell type*		X
▪ Claim 26 – *the specific Boolean operation*	X	
▪ Claims 27-30 – *the method of*	X	
Claim Rejections – 35 USC §101	[redacted]	[redacted]
▪ Claims 21-25 – not tangibly embodied because it could be practiced with pencil and paper;	X	
	[redacted]	[redacted]
▪ Claims 21-30 – no useful, concrete, and tangible result.		X
	[redacted]	[redacted]

Information Disclosure Statement (IDS)

A copy of Antony, Richard T., "Principles of Data Fusion Automation", Artech House, Inc. 1995, consistent with the current IDS listing accompanies this Reply.

Drawings

The OA requested that Figures 4, 6, 8, 22, and 30 be corrected. Each of these figures were corrected as part of the 01/21/2005 Amendment.

Abstract

A replacement Abstract of under 150 words in length was included with the Substitute Specification submitted as part of the 01/21/2005 Amendment.

Specification

A substitute specification with consistent notation for (boundary, boundary) indexing cells was submitted as part of the 01/21/2005 Amendment.

Claim Rejections – 35 USC §112

The remaining rejections to the Claims under 35 USC §112 are directed to the phrase *for each remaining indexing cell type* found in Claim 21 and Claim 26. The OA asserts that each claim :

> … recites the limitation "for each remaining indexing cell type" in the last second line of the claim. It is unclear which remaining indexing cell type is referred to because only (boundary, boundary) indexing cell type has been recited.

While the undersigned does not agree that the phrase *each remaining indexing cell type* is unclear, Claims 21 and 26 have been amended to broaden the claim and remove the limitation.

Claim Rejections – 35 USC §101

With regarding to Claims 21-30, the OA asserts:

> … it appears to be directed to abstract ideas of performing Boolean operations without producing a concrete, useful, and tangible result.

With regard to "useful," the PTO's own training materials[1] state that:

> a) the utility need not be expressly recited in the claims, rather it may be inferred; (b) if the utility is not asserted in the written description, then it must be well established; ...

The claims positively recite the accumulation of *result tuples* that represent the product of a Boolean operation among a first and second region. The specification recites several examples of the utility of embodiments of the invention, e.g.,

> *[0003]... image processing, spatial data analysis, constraint-based reasoning, earth resource evaluation, crop management, market analysis studies, microfabrication, mining, weather forecasting, military planning, and utility management. For example, rain forest shrinkage over time can be studied by performing Boolean set intersections between processed earth resource imagery and historical vector-represented geo=spatial map products depicting vegetation. ... Ground-based target locations for military applications can often be significantly refined by intersecting sensor generated error ellipses with domain features that favor the presence of such vehicles ...*

Here, in addition to the utility recited in the claims of *accumulating result tuples*, the written description contains several assertions of the utility of the invention.

With regard to "concrete," the PTO states (at the same source as above):

> Usually, this question <concreteness> arises when a result cannot be assured. An appropriate rejection ... should be accompanied by a lack of enablement (35 U.S.C. 112) rejection, ...

The specification provides detailed disclosure illustrating that the results of computer program products and methods of the technology can be assured. In fact, the specification points out that establishing and classifying indexing cells about two regions is known.

> *[0056] Two of the steps are known (Antony treatise, supra at 95), and these include the steps of: establishing indexing cells about the two subject regions; and 2) distinguishing three canonical form classes of indexing cells ...*

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[1] http://www.uspto.gov/web/menu/pbmethod/trangmaterials.ppt.

The specification then provides detailed disclosure as to how each type of indexing cell is processed to perform a Boolean operation on the two regions.

The specification provides ample disclosure as to the assured nature of the results, i.e., concreteness.

With regard to "tangible," the PTO states (same materials as above):

> ... the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. ... In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permits the data structure's functionality to be realized, and is statutory.

In Claims 21-25, a method *for performing Boolean operations in a digital computer* is claimed. In Claims 26-30, a *computer program product* including *a computer readable medium* and various *modules* is claimed. In each case, the claims explicitly call for an interrelationship between the data structure (e.g., regions represented as vector tuples), and the computer software and hardware components (e.g., a digital computer, a computer program product) which permit the data structure's functionality (e.g., vector tuple representation of the result of a Boolean operation between regions) to be realized, i.e., a tangible result.

In summary, the claimed invention does produce a useful, concrete, and tangible result in that the claims and the specification assert multiple utilities for assured results from interrelated data structure (e.g., regions represented as vector tuples), computer software (claimed steps and module functionality), and computer structure (e.g., digital computer/computer readable medium/modules) which permit functionality (e.g., vector tuple representation of the result of a Boolean operation between regions) to be realized.

For the above reasons, the undersigned requests that the rejection of Claims 21-30 as being directed to abstract ideas be withdrawn.

CONCLUSION

No new matter has been added to the disclosure. An examination on the merits at your earliest convenience is respectfully requested. Please contact undersigned with any questions that will expedite prosecution.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-1458, and please credit any excess fees to such deposit account.

Respectfully submitted,

Date: March 23, 2005

Michael J. Dimino
Registration No. 44,657

KILPATRICK STOCKTON LLP
607 14th St., N.W., Suite 900
Washington, D.C. 20005
(202) 508-5883

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